

# International Civil Aviation Organization Supersonic Task Group Status & Progress

## APA-20 Special Session: Low-Boom Flight Demonstration

Presented to: AIAA AVIATION 2014 Conference

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Federal Aviation  
Administration

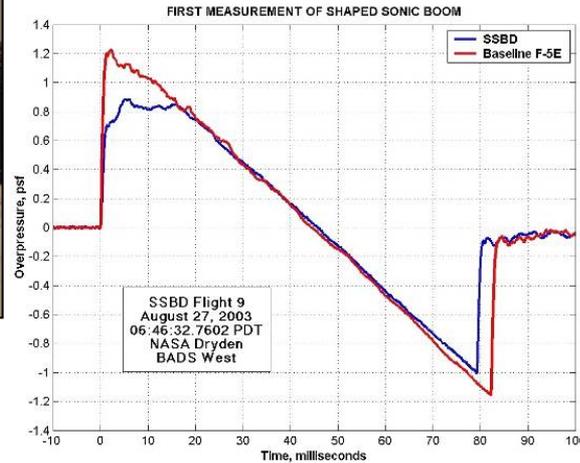


# Outline

- **Motivation & Regulatory Challenges**
- **ICAO- Path Forward through WG-1 SSTG**
- **Elements of a Standard**
- **Supersonics Research to Shape Standards**
- **Next Steps**



# Motivation over the last decade



Boom shaping proven by Shaped Sonic Boom Demonstrator (SSBD) under NASA/DARPA



Concorde decommissioned



New project aircraft being proposed



Federal Aviation Administration

# Sonic Boom Policy & Regulations

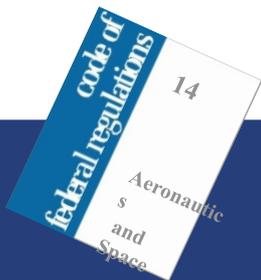
## ICAO Assembly Resolution A33-7, Appendix G states:

“The Assembly reaffirms the importance it attaches to ensuring that no unacceptable situation for the public is created by sonic boom from supersonic aircraft in commercial service.”

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## U.S. regulations on Civil Aircraft Sonic Boom under 14 CFR § 91.817 established in March 1973 states:

- No person may operate a civil aircraft in the United States at a true flight Mach number greater than 1 except in compliance with conditions and limitations in an authorization to exceed Mach 1 issued to the operator under Appendix B of this part.
- In addition, no person may operate a civil aircraft for which the maximum operating limit speed  $M_{mo}$  exceeds a Mach number of 1, to or from an airport in the United States, unless –...
- Information available to the flight crew includes flight limitations that ensure that flights entering or leaving the United States will not cause a sonic boom to reach the surface within the United States; and ....



# ICAO- Path Forward through WG-1 SSTG

- The **International Civil Aviation Organization (ICAO)** is a UN specialized agency, created in 1944 upon the signing of the Convention on International Civil Aviation (Chicago Convention).

ICAO works with the Convention's 191 Signatory States and global industry and aviation organizations to develop international Standards and Recommended Practices (SARPs) which are then used by States when they develop their legally-binding national civil aviation regulations.



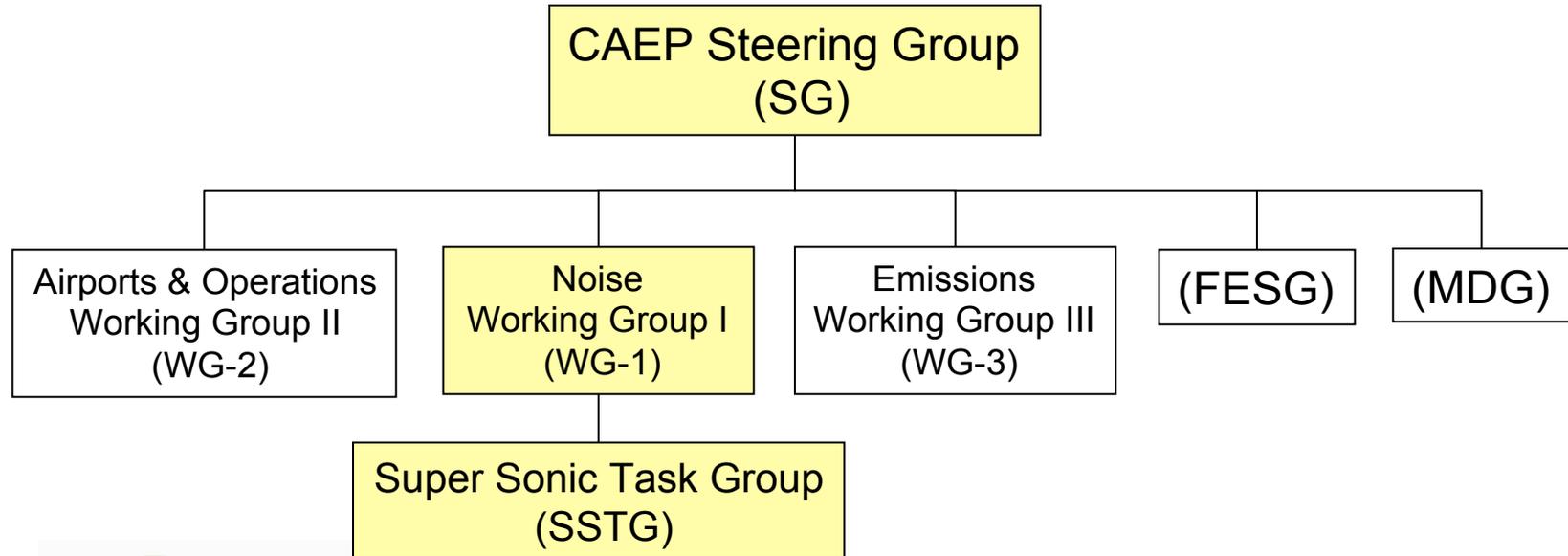
**Vision:** Achieve the sustainable growth of the global civil aviation system.

**Mission:** To serve as the global forum of States for international civil aviation.

ICAO develops policies and Standards, undertakes compliance audits, performs studies and analyses, provides assistance and builds aviation capacity through many other activities and the cooperation of its Member States and stakeholders.



# Committee on Aviation Environmental Protection (CAEP)



## To limit or reduce:

- the number of people affected by significant aircraft noise
- the impact of aviation emissions on local air quality
- the impact of aviation greenhouse gas emissions on the global climate



# Noise WG-1/SSTG

**Aim:** WG-1 to keep ICAO noise certification standards (Annex 16, Volume I) up to date and effective, while ensuring that the certification procedures are as simple and inexpensive as possible.



## **Comprised of:**

- Technical experts from CAEP Member States and Observers (airframe & engine manufacturers, airlines, airports, etc)
- Super Sonic Task Group (SSTG) – is delegated with the technical focus on supersonics and has Research Focal Points (3) – USA, Japan, and France reporting to CAEP Steering Group as expert supersonics advisors.



# Supersonics & Elements of a Standard

METRIC:

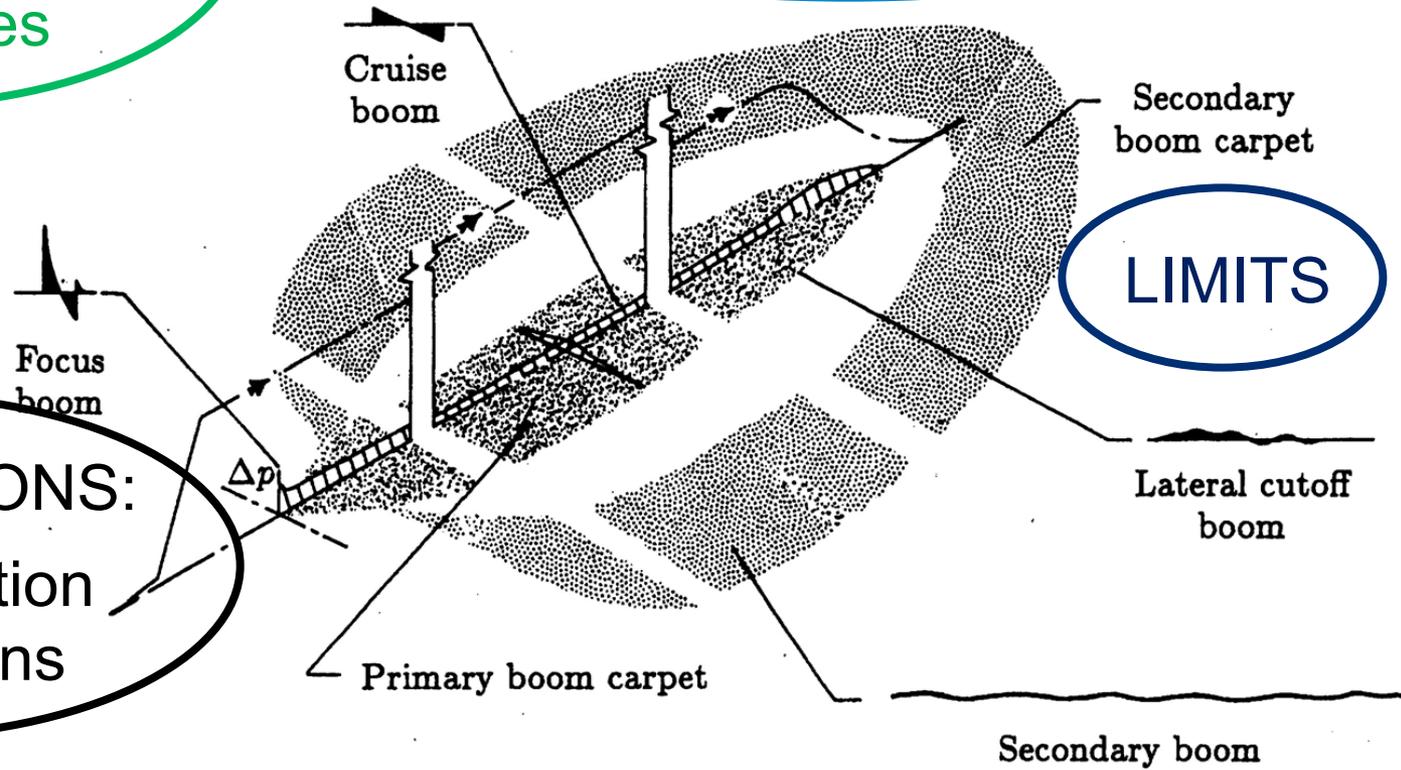
Acoustical Set-up & Measures

PROCEDURES:

Reference Flight Profiles & Aircraft State

CORRECTIONS:  
of Propagation & Deviations

LIMITS



# SSTG Activities

Since 2004, SSTG continues to:

- Monitor supersonic transport projects
- Monitor the research on sonic boom  
(characterization, measurements & acceptability)
- Define preliminary standards for cruise noise certification for Steering Group consideration by CAEP/10

NASA and JAXA continue to capture experimental data and test for human response metrics.

Milestones:

- Reaffirmed terminal noise certification standards for subsonic aircraft applies to supersonic, ie, Stage 4. [Oct08]
- Established & updating Supersonics R&D Roadmap.



# Supersonics Research Roadmap

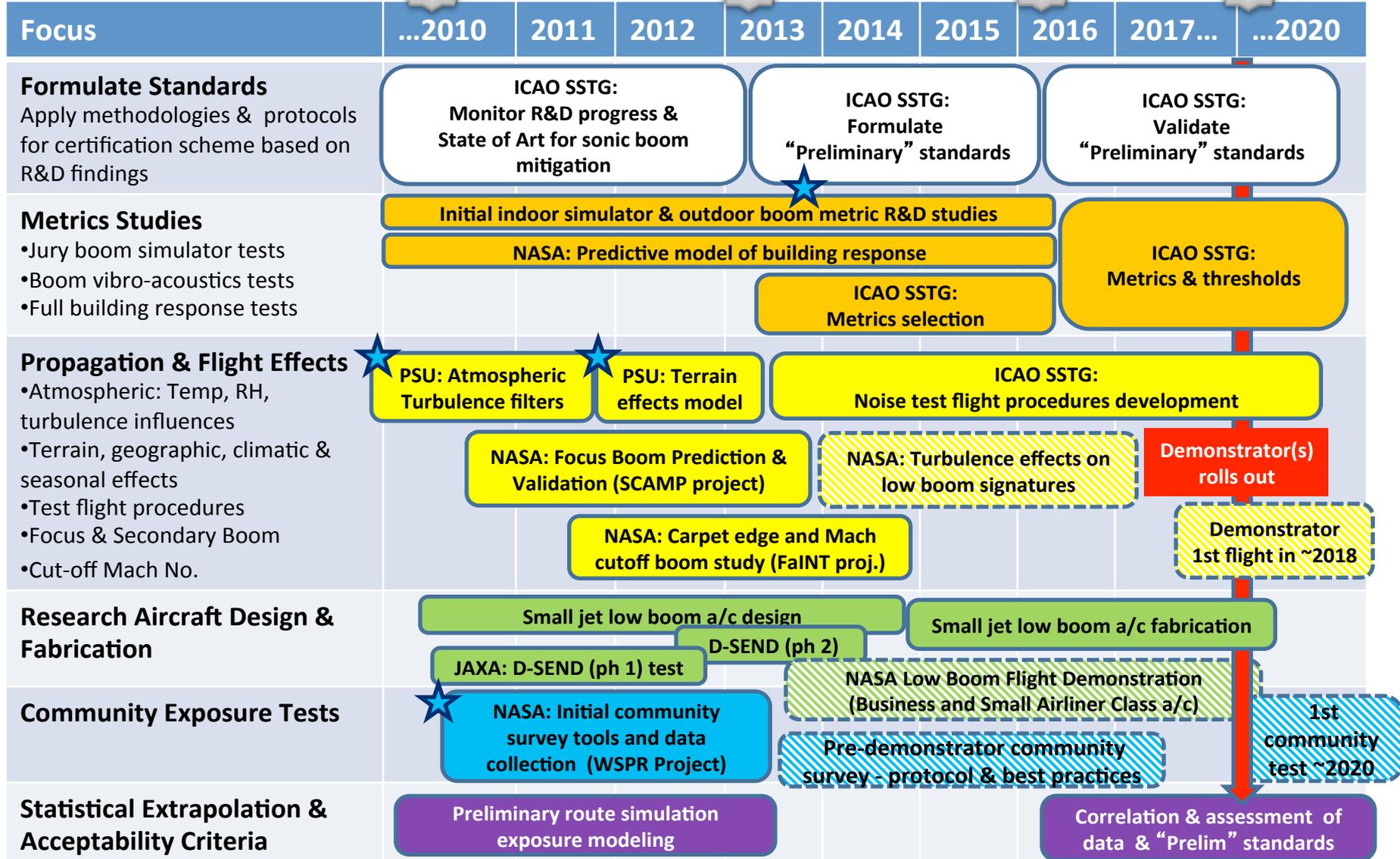
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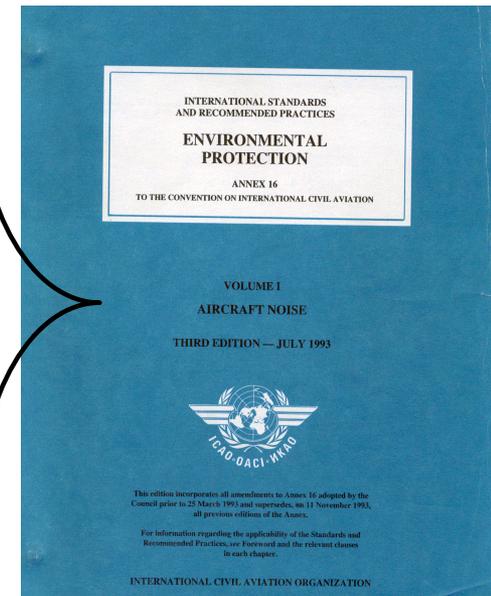
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CAEP



# Compiling Data to Define a Standard

Technical factors	Objective
<p><b>Metrics (acoustical) Studies</b></p> <ul style="list-style-type: none"> <li>Jury boom simulator tests</li> <li>Boom vibro-acoustics tests</li> <li>Full building response tests</li> </ul>	<p>Quantify noise impact for certification scheme</p>
<p><b>Propagation &amp; Flight Effects</b></p> <ul style="list-style-type: none"> <li>Atmospheric: Temp, RH, turbulence influences</li> <li>Terrain, geographic, climatic &amp; seasonal effects</li> <li>Test flight procedures               <ul style="list-style-type: none"> <li>** Focus &amp; Secondary Boom</li> <li>** Cut-off Mach No.</li> </ul> </li> </ul>	<p>Bound influencing factors for highest signal quality/ repeatability for type certification</p>
<p><b>Community Exposure Tests</b></p>	<p>Survey statistical human response to define acceptability threshold</p>



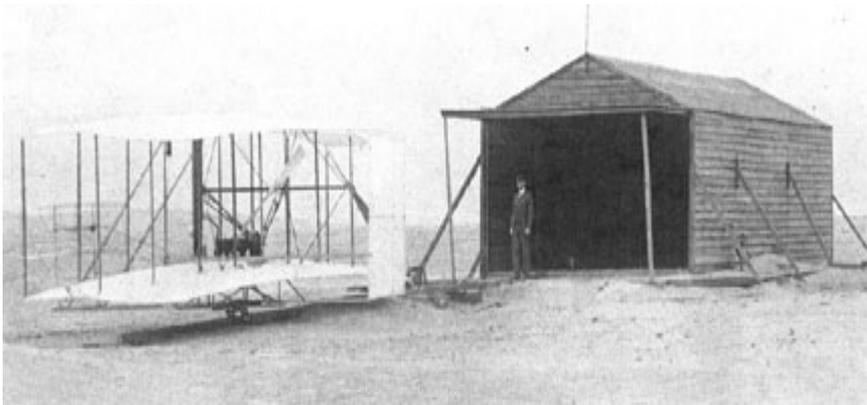
# Next Steps

- Stakeholders continue to openly work within ICAO to track scientific progress and data of supersonic activities.
- Stakeholders continue to commit intellectual knowledge and resources for shaping the development of supersonic standards.

## Key industry challenges:

1. Create a design to be environmentally acceptable to an alternative (of Mach) threshold not yet justified.
2. Must successfully demonstrate the critical technologies.
3. Prove by demonstrator that sonic boom suppression technology is adequate for public safety, health and welfare.





**Thank You for your attention!**

**Questions?**

